

Appl. No. 10/687,299
Amdt. Dated May 23, 2006
Reply to Office Action of Feb. 23, 2006

REMARKS

Claim Rejections under 35 U.S.C. 103(a)

Claims 1-18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Butscher (US 4,605,933) in view of Lee (US 6,839,028) and further in view of OKA et al. (US 5,907,308).

In response to the claims rejections, applicant has amended the claims 1, 8, and 12 to incorporate subject matter which can find support from the claims 1, 8, and 12, thus, no new matter problem is raised.

Amended claim 1 is now believed to be patentable. Detailed explanations are given below.

Regarding independent claim 1, a patch antenna employed in a portable electrical device as defined therein comprises a planar ground plane; a radiating element parallelly disposed above the ground plane with a predetermined distance; a plurality of dielectric supporting portions disposed between the ground plane and the radiating element for supporting the radiating element; a metal match tab electrically connected with the radiating element; and a feeder cable comprising an inner conductor electrically and directly mechanically connecting with the match tab and an outer shield conductor electrically and mechanically connecting with the ground plane.

As Examiner believes, firstly, neither Butscher nor Lee discloses the inner conductor of the feed cable directly mechanically connecting with the matching tab element in the DETAILED ACTION. Secondly, "a match tab electrically connected with the radiating element" in claim 1 of the present

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invention is not disclosed in Butscher. It is clearly found that a slot is formed in the radiating element 20 and the tab 24 in fig. 2 of the Butscher. A capacitor is formed between the radiating disk 20 and the matching tab 24. It is well-known that the capacitor is an open circuit. So, it is clear that the radiating element 20 does not couple with the tab 24 of the Butscher.

In addition, OKA describes that the inner conductor of the feed cable directly mechanically connecting with the impedance matching circuit 20 but not a metal matching tab element. It is clear that a matching circuit is different from a metal matching tab element. The metal matching tab element has a great advancement compared with the matching circuit.

Firstly, the metal matching tab element has simple structure compared with the matching circuit 20. The metal matching tab element is just made from a metal piece, while the matching circuit needs a lot of electrical components. The matching circuit 20 in fig 2 of OKA includes L1, L2, R1, R2, C1, and C2, which is completely different from the metal matching tab element in present invention. In addition, manufacture of the antenna of the present invention is more simple than OKA.

Secondly, the metal matching tab element and the radiating element are formed in the same metal piece, the matching circuit 20 of OKA connects to the antenna terminal 16 by a conductor line, so electrical and mechanical connection of the metal matching tab element and the radiating element is better than OKA.

Thirdly, the antenna of OKA and the antenna of the present invention are

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respectively used in different fields. Although OKA does not directly disclose in which field the antenna is used, but the prior art U.S. Pat. No. 5,239,302 definitely discloses the antenna used in a motor vehicle (see Field of the Invention). The antenna of OKA just improves some function compared with the 5,239,302. So, it is clear that the antenna of OKA is also used in a motor vehicle or the like. But, the antenna of the present invention is used in a portable electrical device.

As depict above, claim 1 is believed to patentable over Butscher in view of LEE, and further in view of OKA et al.

Therefore, claims 2-6 and 20 also should be allowed since their dependence from the allowable claim 1.

Amended claim 7 is also believed to be patentable. Detailed explanations are given below.

Regarding independent claim 7, a patch antenna for a portable electronic device, comprises: a planar metal sheet comprising a first element, a second element and a connecting patch connecting the first element with the second element; a first ground plane disposed adjacent to the first element; a second ground plane parallelly spaced from the metal sheet a predetermined distance; a shorted patch connecting the first ground plane to the second ground plane; a plurality of dielectric supporting portions disposed between the metal sheet and the second ground plane to support the metal sheet; and a feeder cable comprising an inner conductor electrically and directly mechanically connecting with the first element and an outer shield conductor electrically and mechanically connecting with the first ground plane.

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As Examiner believes, firstly, neither Butscher nor Lee discloses the inner conductor of the feed cable directly mechanically connecting with the matching tab element in the DETAILED ACTION. Secondly, "a planar metal sheet comprising a first element, a second element and a connecting patch connecting the first element with the second element" in claim 7 of the present invention is not disclosed in Butscher. It is clear that a slot formed between the radiating element 20 and the tab 24 in fig. 2 of the Butscher. A capacitor is formed between the radiating disk 20 and the matching tab 24. It is well-known that the capacitor is an open circuit. So, it is clear that the radiating element 20 does not connect with the tab 24 of the Butscher.

In addition, OKA describes that the inner conductor of the feed cable directly mechanically connecting with the impedance matching circuit 20 but not a metal matching tab element. It is clear that a matching circuit is different from a metal matching tab element. The metal matching tab element has a greatness advancement compared with the matching circuit.

Firstly, the metal matching tab element has simple structure compared with the matching circuit 20. The metal matching tab element just made from a metal piece, while the matching circuit needs a lot of electrical components. The matching circuit 20 in fig 2 of OKA includes L1, L2, R1, R2, C1, and C2, which is completely different from the metal matching tab element in present invention. In addition, manufacture of the antenna of the present invention is more simply than OKA.

Secondly, the metal matching tab element and the radiating element are

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formed in the same metal piece, the matching circuit 20 of OKA connects to the antenna terminal 16 by a conductor line, so electrical and mechanical connection between the metal matching tab element and the radiating element is better than OKA.

Thirdly, the antenna of OKA and the antenna of the present invention are respectively used in different fields. Although OKA does not directly disclose the antenna using where but the prior art U.S. Pat. No. 5,239,302 definitely discloses the antenna using in a motor vehicle (see Field of the Invention). The antenna of OKA just improves some function compared with the 5,239,302. So, it is clear that the antenna of OKA is also used in a motor vehicle or the like. But, the antenna of the present invention is used in a portable electrical device.

As depict above, claim 7 is believed to patentable over Butscher in view of LEE, and further in view of OKA.

Therefore, claims 8-11 also should be allowed since their dependence from the allowable claim 7.

Amended claim 12 is also believed to be patentable. Detailed explanations are given below.

Regarding independent claim 12, a patch antenna for a portable electrical device comprising: a first metal element, a second metal element and a metal connecting patch connecting the first element with the second element; a ground portion disposed adjacent to the first element; and a feeder cable comprising an inner conductor electrically and directly mechanically connecting with the first

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element and an outer shield conductor electrically connecting with the ground portion; wherein the connection patch has a characteristic impedance same as that of the input impedance of the second element.

As Examiner believes:

"The connection patch has a characteristic impedance same as that of the input impedance of the second element" and "a metal connecting patch connecting the first metal element with the second metal element" disclosed in claim 12. The matching tab 24 (alleged the connection patch) of Butscher is separated from the disk 20, while the connection patch of the present invention connects the first element with the second element.

As shown in column 3, lines 12-15 and column 2, lines 63-66 along with FIGS. 1-2, it is recited that an impedance matching tab 24 extends upward from the lower ground plate 12 to the region in front of the radiating disk 20 along the centerline 23, and the tab 24 primarily provided matching capacitance. Apparently, the matching tab 24 extends away from the ground plate 12 while fails to reach to the radiating disk 20. It is clear that a slot formed between the radiating element 20 and the tab 24 in fig. 2 of the Butscher. A capacitor is formed between the radiating disk 20 and the matching tab 24. It is well-known that the capacitor is an open circuit. So, it is clear that the radiating element 20 does not connect with the tab 24 of the Butscher.

As depict above, applicants 12 is believed to patentable over Butscher in view of LEE.

Therefore, claims 13-18 also should be allowed since their dependence from the allowable claim 12.

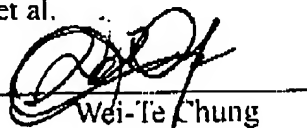
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Favorable reconsideration and withdrawal of the rejection are respectfully requested.

In view of the above claim amendments and remarks, applicants believe that the claims now pending are in a condition for allowance. Favorable consideration is respectfully requested.

Respectfully submitted,
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